

REMARKS

Applicants respectfully request reconsideration of the present application in view of the reasons that follow.

Claims 1 and 5-73 are currently pending. Claims 1, 23, 60, 61, 66, and 69 have been amended. Applicants submit that the amendments are fully supported by the specification as originally filed including, but not limited to the claims as originally filed and the examples provided. No new matter has been added by way of amendment.

I. Claim Rejections Under 35 U.S.C. § 102.

Claims 1, 5-8, 12-19, 21-23, 25, 26, 28-38, 45-53, and 56-60 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,120,839 issued to Emmons *et al.* The Examiner states that Emmons discloses “a process utilizing an anionically produced polyether epoxy polymer (IV and V in column 7) and a free radically produced acrylate in Example 7 with applicants characteristics.” The Examiner specifically refers to Example 24 in the ‘839 patent for an example. Applicants respectfully traverse this rejection.

Applicants claim “an oligomer modified anionically polymerized polymer.” To assist in parsing the claim, the following indentations are used to separate the elements of the polymer comprising the reaction product of

 a free-radically polymerized oligomer obtained from reaction of
 one or more monomers selected from the group consisting of vinyl
 aromatic monomers and ester functional monomers and
 one or more monomers selected from the group consisting of epoxy
 functional monomers, anhydride functional monomers, ester
 functional monomers and carboxylic acid functional monomers,
 the oligomer having a number average molecular weight of about 1000 to
 about 5000 g/mol and a weight average molecular weight of about
 1500 to about 18,000 g/mol; a number average number of

functional groups from about 4 to about 12; and a polydispersity index of about 1.5 to about 4.5 and an anionically polymerized polymer, wherein the number average number of functional groups is calculated based upon functional groups selected from the group consisting of epoxy functional groups, anhydride functional groups, and carboxylic acid functional groups.

Thus, the instantly claimed polymers comprise a free-radically polymerized oligomer, and an anionically polymerized polymer. The free-radically polymerized oligomer is further made from the reaction of the monomers specified in the designated groups.

By contrast, Emmons teaches aminolysis products obtained by reaction of acrylate or methacrylate oligomers having a number-average molecular weight (Mn) in the range of 600 to 10,000, preferably in the range of 1,000 to 5,000 with aliphatic amines. Col. 2, lines 14-22. The aminolysis products disclosed by Emmons can be used as curing agents in organic solvent systems as well as in aqueous systems to produce outstanding resistant epoxy resin films, coatings and impregnants. Col. 1, lines 10-27. Emmons further discloses that the aminolized oligomers are especially useful in the preparation of coating and adhesive compositions based on epoxy resins in which the oligomer serves as a curing agent. (col. 5, lines 13-16). The presently claimed materials do not recite aminolysis products.

In the rejection, the Examiner states that Emmons "disclose[s] a process utilizing an anionically produced polyether epoxy polymer (see "IV" and "V" in column 7) and a free radically produced acrylate in Example 7..." Office Action, page 2. The Examiner also points to Example 24 in which the Example 7 material is used. *Id.* However, Applicants submit that the materials of Formulas IV and V are *not anionically polymerized polymers*, as that phrase is used in the instant application, and therefore the combination of the Formula IV and/or V polymers with Emmons' example 7 does not result in the oligomer modified anionically polymerized polymers of the presently claimed invention.

The polyether epoxy polymers of Formulas IV and V are not anionically polymerized polymers. Emmons states at column 7, lines 16-18, that the epoxy resins of formula IV can be made by the method disclosed in U.S. Patent Nos. 2,324,483 and 2,444,333 and in British patents 518,057 and 579,698. In each of these references, the polymerizations are carried out in caustic aqueous solutions. In contrast, anionic polymerization, or anionic living polymerization, as defined in the instant specification, uses alkali metal initiators to polymerize materials via the creation of a carbanion that reacts with another monomeric unit and regenerates the carbanion. Paragraph 25 of the published application US 2005/0027071. For anionic polymerization, hydrocarbon solvents are used under inert conditions to prevent premature termination of the living anionic polymers. Paragraph 26 of the published application US 2005/0027071. Paragraph 32 lists the common initiators used for anionic polymerizations, a listing that includes organo lithium compounds, which are well known to those of skill in the art to react violently with water. Hence, based upon the descriptions provided in the specification with regard to anionic polymerization, and in the references discussed in Emmons with respect to the preparation of the compounds of Formulas IV and V, the compounds of Formulas IV and V are not anionically polymerized polymers.

The combination of the compounds of Formulas IV and/or V with the free-radically polymerized polymer of Example 7 does not result in the claimed polymers. The claims require the reaction product of a free-radically produced oligomer and an anionically polymerized polymer. Because the materials of Formula IV and/or V are not anionically polymerized polymers, their combination with the free-radically produced polymers of Example 7 will *not* result in the claimed compositions.

Applicants submit that the presently claimed compositions are novel over the Emmons reference. Because Emmons fails to teach each and every element of the claims as currently presented, Emmons cannot be found to anticipate any of the independent claims currently pending, and by definition all of the claims depending therefrom. Applicants respectfully request removal of the rejections under 35 U.S.C. § 102.

II. Claim Rejections Under 35 U.S.C. § 103.

Gottschalk in view of McCormick, Klier, or Emmons

Claims 61-63, 66-74, and 76 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,998,554, issued to Gottschalk, *et al.*, in view of U.S. Patent Publication No. 2006/0111532, applied for by McCormick *et al.*, or U.S. Patent No. 6,143,820, issued to Klier, or Emmons. Applicants respectfully traverse this rejection.

The Examiner admits that there “are no examples in Gottschalk of B components with applicants weight average molecular weights and number average molecular weights.” Office Action, page 3. Applicants agree and take this one step further: there are no examples in Gottschalk of compounds encompassed by the oligomers of the presently claimed invention.

As recited in claim 61, “...(a) a free-radically polymerized oligomer obtained from reaction of one or more monomers selected from the group consisting of vinyl aromatic monomers and ester functional monomers and one or more monomers selected from the group consisting of epoxy functional monomers, anhydride functional monomers, ester functional monomers and carboxylic acid functional monomers...” Emphasis added. All of the Gottschalk polymers are based upon vinyl aromatic and acrylonitrile monomers. As will be recognized, acrylonitrile is not one of the polymers recited in either of the Markush listings. Gottschalk specifically requires the presence of **both** a vinyl aromatic (50 to 99.9%) and either acrylonitrile, methacrylonitrile, or a mixture thereof (0.1 to 50%). Col. 3, lines 36-43. In fact, Gottschalk emphasizes that the “main components are styrene and acrylonitrile.” Col. 4, lines 6-7.

Therefore, Gottschalk fails on two fronts with regard to the presently claimed oligomer—(1) the weight and number average molecular weight ranges and (2) the monomeric makeup of the oligomers. Likewise, McCormick, Klier, and Emmons fail to remedy the situation. Emmons’ failings are described above with regard to the rejection under 35 USC § 102.

McCormick is directed to “[p]olymers and copolymers synthesized by means that yield a narrow range of molecular weights can have different properties than polymers synthesized by conventional means. In order to obtain such polymers, however, polymerization must be controlled.” Abstract. To do this, McCormick focuses on the use of a “reversible addition-fragmentation chain transfer (RAFT) procedure with dithioesters or trithioesters as chain transfer agents (CTA’s).” Paragraph 23. McCormick notes that such “dithioester and trithioester chain transfer agents of the present invention are particularly advantageous [because] [t]hey can be used to produce polymers with low polydispersities.” *Id.* McCormick does not disclose materials that meet each and every element of the oligomers described in Claim 1. Hence, as with Gottschalk, McCormick fails to teach the oligomers of the present claims.

Klier is directed to low polydisperse water-soluble polymeric compositions. See Title. The materials of Klier are specifically for use in “detergent formulations..., dispersants, sequestration agents, antiscalants..., and as dispersants...” Col. 1, lines 7-13. As will be noted, claims 61, 66, and 69 are all directed to polymers that are for use in asphalt, plastics, and rubbers, as, for example, reinforcing agents. Such polymers have different properties and will not be co-extensive with the water-soluble Klier materials which are useful in solution. Thus, the Examiner’s reliance upon Klier for a teaching of polydispersity is misplaced with regard to a materials that are used in solution versus those that are found in asphalt, plastics, and rubbers, as is presently claimed.

The fact remains, to establish a *prima facie* case of obviousness, the Examiner must provide reasons to combine or modify the references to teach each and every limitation of the claimed invention. Without more, Applicants submit that Gottschalk in view of McCormick, Klier, or Emmons, alone or in combination, fail to provide the requisite modifications to establish such a *prima facie* case of obviousness, and request that the Examiner reconsider and remove the noted rejections.

Brandstetter and McCormick, Lai, or Greenblatt

Claims 1, 5-63, and 66-76 stand rejected under 35 U.S.C. § 103(a) as being obvious over German Patent No. DE 3150171, issued to Brandstetter *et al.*, in view of U.S. Patent Publication No. 2003/0191262, applied for by McCormick *et al.*, U.S. Patent Publication No. 2003/0187138, applied for by Lai, or U.S. Patent Publication No. 2003/0069363, applied for by Greenblatt. Applicants respectfully traverse this rejection.

As above, the cited references fail to teach or suggest each and every element of the claims as pending. The invention as defined by Claim 1, for example, distinguishes the cited art by reciting “*...a free-radically polymerized oligomer obtained from reaction of one or more monomers selected from the group consisting of vinyl aromatic monomers and ester functional monomers and one or more monomers selected from the group consisting of epoxy functional monomers, anhydride functional monomers, ester functional monomers and carboxylic acid functional monomers...*” Emphasis added. Applicants submit that alone or in combination, Brandstetter, McCormick, Lai, and Greenblatt fail to establish a *prima facie* case of obviousness with regard to the pending claims. With regard to McCormick, Applicants direct the Examiner’s attention to the above remarks regarding McCormick as failing to fill the voids of Gottschalk, and those remarks are likewise relevant here with regard to Brandstetter.

A translation of Brandstetter, a German document, was provided by the PTO. Brandstetter is directed to the preparation of block co-polymers based upon ethylene co-polymers that contain any of a number of functional groups. Page 3 of the translation. The ethylene co-polymers are then reacted with living polymer anions. Page 5 of the translation. Brandstetter teaches that the “ethylene copolymers have the general formula: $[(A_n)(B)_k]$, whereby A = $-\text{CH}_2-\text{CH}_2-$, B is the co-monomer polymerized in with one of the above-described functional groups...” Page 6 of the translation. Such ethylene co-polymers may be produced by radical decomposed polymerization, which Applicants believe to be a poor translation for a free-radical polymerization. *Id.*

In so describing the identity of the ethylene copolymers, Brandstetter fails to teach or suggest a free-radically polymerized oligomer obtained by reaction of the recited monomers. The claimed oligomers require the free-radically polymerized oligomer be obtained from the reaction of *one or more monomers selected from the group consisting of vinyl aromatic monomers and ester functional monomers* and *one or more monomers selected from the group consisting of epoxy functional monomers, anhydride functional monomers, ester functional monomers and carboxylic acid functional monomers...*" The Brandstetter materials require ethylene copolymerization with other monomers. Co-polymerization of ethylene with other monomers is not encompassed by the presently pending claims with regard to the free-radically polymerized oligomer.

Because Brandstetter fails to teach or suggest the claimed free-radically polymerized oligomers, McCormick, Lai, or Greenblatt must be relied upon to teach at least this element. They do not.

Lai, is directed to "s,s'-bis-(α,α' -disubstituted- α'' -acetic acid)-trithiocarbonates and derivatives thereof, as well as a process for making the same." Paragraph 2. "Such compounds can be reacted with monomers to form acrylate repeat units within the compound [and subsequently], functional end groups can be added thereto such as epoxy, vinyl, or hydroxyl groups." *Id.* The Examiner relies upon Lai for a discussion of the polydispersities that may be achieved using the described trithiocarbonate materials. Office Action, pages 4-5. Lai does not teach, suggest, or exemplify the free-radically polymerized oligomers as found in the presently presented claims.

Greenblatt is directed to the preparation of oligomers with a low degree of polymerization, without the need for the use of excessive amounts of initiators. Paragraph 13. Again, the Examiner relies upon Greenblatt solely for support related to polydispersity ranges. Office Action, pages 4-5. However, Greenblatt does not disclose polymers having the stated elements, at least with regard to the claimed free-radically polymerized oligomer. Without more, Greenblatt does not fill the deficiencies of Brandstetter.

Applicants submit that Brandstetter in view of McCormick, Lai, or Greenblatt fails to provide the requisite modifications to establish a *prima facie* case of obviousness, and request that the Examiner reconsider and remove the noted rejections.

V. Rejoinder

In the Office Action of 1/20/2006, claim 37 was indicated as withdrawn as a non-elected species. 37 C.F.R. § 1.141 provides for rejoinder of non-elected species in an application where a generic claim is found allowable. Applicants submit that claim 1, which is generic to claim 37, is now allowable. As such, Applicants respectfully request that the Examiner rejoin claim 37 pursuant to Rule 141.

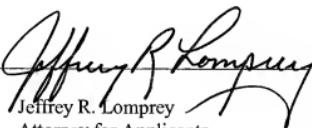
CONCLUSION

Applicants believe that the present application is now in condition for allowance, and request that the Examiner remove all rejections, allowing the application to move forward to issuance. Favorable reconsideration of the application as amended is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

Respectfully submitted,

By



Jeffrey R. Lomprey
Attorney for Applicants
Registration No. 55,401

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FOLEY & LARDNER LLP
Customer Number: 23524
Telephone: (608) 258-4288
Facsimile: (608) 258-4258